

# Oxygen-Methane Thruster, Phase I

Completed Technology Project (2006 - 2006)



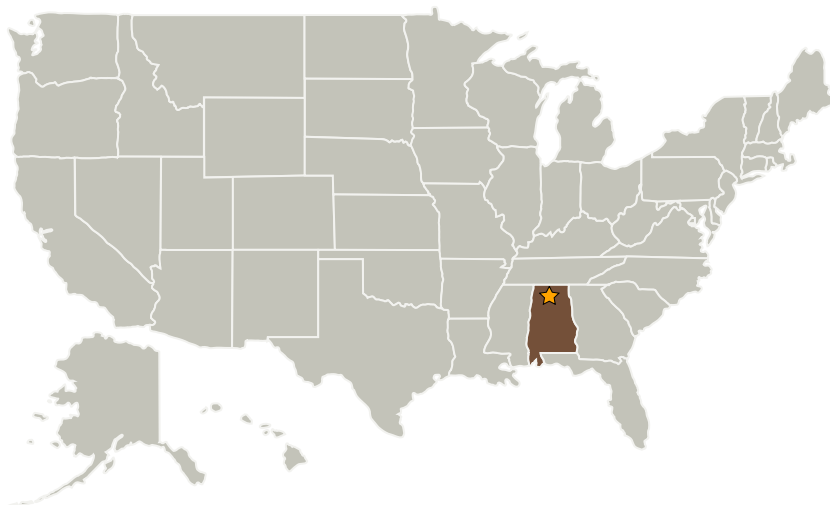
## Project Introduction

Orion Propulsion, Inc. proposes to develop an Oxygen and Methane RCS Thruster to advance the technology of alternate fuels. A successful Oxygen/CH<sub>4</sub> RCS Thruster will also be new reaction control engine that integrates readily with primary propulsion by using the same propellants. Orion has developed a preliminary design of an Oxygen / Methane (O/M) RCS Thruster, and our purpose is to contribute to NASA Space Exploration goals by increasing the technology readiness of oxygen/methane rocket systems. Orion has demonstrated the current development status of our thruster with some 40 firings at sea level. The objective of the Phase 1 R&D would be to improve credibility of its design by testing another prototype test article, which is equipped with a flight type nozzle and propellant valves. These tests would be performed in an environmental chamber at reduced pressure to simulate space vacuum conditions. Although, the O/M Thruster test article would be constructed of stainless steel, its interior would be coated with a refractory metal alloy. This treatment enables the test article to sustain higher temperatures and enables longer tests. The expected result of a Phase 2 effort would be a flight-ready prototype thruster for delivery to NASA.

## Anticipated Benefits

Potential NASA Commercial Applications: Military and commercial space operations could also benefit by using oxygen / methane propulsion, thereby improving the benefits of higher production volumes for the thruster. The more application of common rocket engine systems by NASA, military, and commercial operators extend the mutual benefits to all of them.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Marshall Space Flight Center (MSFC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center (MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Orion Propulsion, Inc.	Supporting Organization	Industry	Huntsville, Alabama

## Primary U.S. Work Locations

Alabama

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Timothy L Pickens

## Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - └ TX01.2 Electric Space Propulsion
    - └ TX01.2.2 Electrostatic